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10/687,600	10/20/2003	Makoto Morishima	520.43227X00	2551

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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT PAPER NUMBER

1745

DATE MAILED: 09/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/687,600	Applicant(s) MORISHIMA ET AL.	
	Examiner Raymond Alejandro	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 4,5,9-11 and 14-23 is/are pending in the application.
- 4a) Of the above claim(s) 9-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-5, 14-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>08/03/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This office action is responsive to the amendment filed 08/22/06. The applicant has overcome the objections, most of the 35 USC 112 rejections and certain rejections under section 102. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments and remarks. However, the present claims (including newly added claims 14-23) are finally rejected over art as set forth hereinbelow and for the reasons of record:

Election/Restrictions and Claim Disposition

1. Claims 9-11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 05/11/06.
2. Claims 1-3 have been cancelled.

Information Disclosure Statement

3. The information disclosure statements (IDS) submitted on 08/03/06 were considered by the examiner.

Drawings

4. The drawings were received on 08/22/06. These drawings are acceptable.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

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The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 22-23 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: in claims 22-23, the limitation “*wherein not every slot is used for electrical connection*”. Any negative limitation or exclusionary proviso must have basis in the original disclosure. Thus, such a negative limitation fails to comply with the written description requirement (See *MPEP 2163 [R-2] Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, para. 1, "Written Description" Requirement and MPEP 2173.05(i) Negative Limitations*). There is simply no support for the above limitation in the as-filed specification. Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 14-23 and 4-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 14 and 20 recite the limitation "*the respective anodes*" in line 5; "*the respective cathodes*" in line 6; and "*the respective slots*" in line 7 (claims 14 and 20). There is insufficient antecedent basis for this limitation in the claim. Claim 14 contains earlier recitation of "a plurality of anodes" and "a plurality of cathodes" but it is uncertain whether applicant intends to include all anodes and/or cathodes and/or slots.
10. Claim 19 recites the limitation "the cathodes and anodes" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 14 contains earlier recitation of "a plurality of anodes" and "a plurality of cathodes" but it is uncertain whether applicant intends to include all anodes and/or cathodes.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

12. Claims 4-5, 14-16 and 19-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Kidai et al 2005/0074651.

Concerning claim 14:

Figure 6 below of Kidai et al depicts a polymer electrolyte membrane comprising a plurality of electrodes 7 consisting of respective electrode substrates and electrocatalyst layers

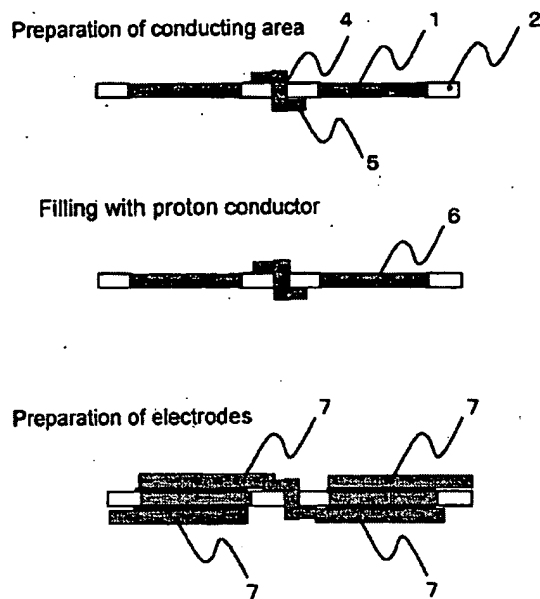
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(P.0058). It is disclosed that connections occur between the anodes and the cathodes located in the opposite sides of the polymer electrolyte membrane, wherein it is preferably to have a structure which interposes electron conductor the polymer electrolyte membrane (P0011). Reference numeral 5 represents the electron conductor through membrane (*the wiring member which electrically connects adjoining electrodes*) ; reference numerals 1 and 2 represent respective porous area and non-porous area of the polymer electrolyte membrane (P0025-0031).

(Emphasis supplied→) EXAMPLE 1 exemplifies the preparation of a multipore film having a porous area 1 and non-porous area 2; wherein the porous area 1 is filled with the Nafion proton conductor (EXAMPLE 1/ P0100-0103). *The electrolyte membrane having a slot may be represented by either the membrane permeating area 4 including the electron conductor through membrane 5 or the multipore film having a porous area (slots).* The anode, cathode and electrolyte are separated by a separator (P0005). *In the instant case, the separators serve as the plurality of wiring plates covering respective cathodes and anodes.* Electrodes 7 are connected through respective electron conductor through membrane 5 (See FIGURE 6).

Examiner's note: *It is noted that the plurality of both negative electrodes and positive electrodes satisfy the claimed requirement of having opposed anode and cathode electrodes in pairs with the solid polymer electrolyte interposed therebetween. It is further noted that the negative electrode performs the inherent function of oxidizing the fuel gas, and the positive electrode performs the inherent function of reducing the oxidant.*

Fig. 6



As to claim 15:

Porous area 1 is filled with Nafion (EXAMPLE 1/ P0100-0103). *If porous area filled with Nafion represents the electrolyte membrane having slots, then, the pores are filled with Nafion which is an electron non-conductive material.*

As to claims 16 and 22-23:

The anode, cathode and electrolyte are separated by a separator (P0005). *In the instant case, the separators serve as the plurality of wiring plates covering respective cathodes and anodes. Furthermore, in fuel cell, respective fuel cell components are either electrically connected, operatively connected or physically connected; and they all are also either directly or indirectly connected. If the membrane permeating area having the electron conductor through membrane 5 is taken to represent the membrane/slot, then the separator plates are both electrically and operatively connected. On the other hand, if porous area filled with Nafion*

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represents the electrolyte membrane having slots, then the separator plates are at least operatively connected. Therefore, not every slot is used for electrical connection.

As to claims 19-21:

*The electrolyte membrane having a slot may be represented by either the membrane permeating area 4 including the electron conductor through membrane 5 or the multipore film having a porous area (slots) (See **EXAMPLE 1** or **FIGURE 6**). Certainly, the slots are formed around the cathodes and the anodes (i.e. proximate to or in the vicinity of the cathodes and anodes); and they are positioned between adjacent anodes and cathodes. In a fuel cell stack configuration, any slot of the slots can be said to be provided between every two adjoining anodes and between every two adjoining cathodes.*

Concerning claims 4-5:

Kidai et al disclose electrodes 7 consisting of respective electrode substrates and electrocatalyst layers (P0058). Particularly, Pt-supported carbon as the catalytic material; and organic solvents and also includes material contributing to ion conduction or an ion conductor which may be proton exchange resins (P0059). It is also disclosed that Pt and Ru, among others, are preferably used and the catalyst included in the electrocatalyst layer may include two different elements such as alloys thereof or a mixture thereof (P0060).

Thus, the present claims are anticipated.

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13. Claims 4-5, 14, 16 and 19-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Choi 6689502.

As to claims 14 and 16:

Figures 2B below of Choi illustrates a conventional electrochemical cell comprising anodes 2a disposed at one side of an ion exchange membrane 1a and cathodes 3a disposed at the opposite sides (COL 2, lines 12-26). In order to electrically connect the respective cells, a connection wire 4 connecting anode 2a and cathode 3a of neighboring cells must pass through the ion exchange membrane 1a between the anode 2a and the cathode 3a. In this case, a path or hole for passage of the connection wire 4 must be provided in the ion exchange membrane 1a (COL 2, lines 12-26). Disclosed is that both of the anode 2 and the cathode 3 include a support layer for supply and diffusion of fuel (COL 1, lines 28-32). *These support layers may serve as the plurality of wiring plates covering respective anodes/cathodes. Thus, they all are either electrically connected, operatively connected and/or physically connected.*

A conventional monopolar cell pack is constructed such that anodes 2a are disposed at one side of an ion exchange membrane 1a and cathodes 3a corresponding to the anodes 2a are disposed at the opposite side, as shown in FIGS. 2A and 2B. In order to electrically series-connect the respective cells, a connection wire 4 connecting the anode 2a and cathode 3a of neighboring cells must pass through the ion exchange membrane 1a between the anode 2a and the cathode 3a. In this case, a path or hole for passage of the connection wire 4 must be provided in the ion exchange membrane 1a. However, since the path or hole is likely to cause leakage of fuel, a path or hole portion should be sealed. If the connection wire 4 does not pass through the ion exchange membrane 1a, the connection wire 4 must be re-routed outside the cell pack.

FIG. 2B (PRIOR ART)

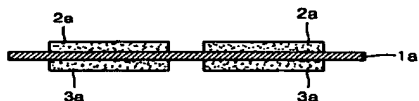


Figure 9 also illustrates a plurality of first anodes 121 disposed in a row on a first surface of an ion exchange membrane, and a plurality of first cathodes 131 disposed on the second surface of the ion exchange membrane (COL 6, lines 45-50).

As to claims 19-22:

Choi discloses that in order to electrically series connected the respective cells, a connection wire 4 connecting anode 2a and cathode 3a of neighboring cells must pass through the ion exchange membrane (COL 2, lines 15-21). *This disclosure implies connecting multiple cells together, therefore, in a configuration serially connecting at least three (3) cells (1st cell connected to 2nd cell connected to 3rd cell), it can be reasonably concluded that the slots are formed around the cathodes/anodes of the 2nd cell and positioned between adjacent anodes/cathodes; a slot is independently provided between every two adjoining anodes/cathodes (one slot between 1st cell and 3rd cell).*

Concerning claims 4-5:

Choi discloses preparing a catalyst slurry by mixing a Pt-Ru catalyst for anode, and a Pt catalyst for cathode, an IPA solution and Nafion (the ion conducting polymer or the electrolyte), being deposited on a carbon black material (COL 8, lines 10-25).

Consequently, the present claims are anticipated.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over: a) Kidai et al 2005/0074651 and/or b) Choi 6689502 as applied to claim 14 above, and further in view of Lawrence et al 2004/0013927.

Kidai et al and Choi are both applied, argued and incorporated herein for the reasons expressed above. However, none of the preceding references fairly discloses the specific plastic sheet.

Lawrence et al disclose the use of a sheet plastic material in fuel cells because it is impervious to methanol.

With these teachings, a person of ordinary skill in the art would have found obvious at the time the invention was made to use the specific plastic sheet of Lawrence et al as a cover of

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either Kidai et al's and/or Choi's cells because Lawrence et al discloses that such a sheet plastic material is impervious to methanol. Therefore, one skilled in the art would have reasonably expected that the advantages discussed in Lawrence et al would have also been achieved by using a plastic sheet to cover the cell of either Kidai et al and/or Choi.

Response to Arguments

17. Applicant's arguments filed 08/22/06 have been fully considered but they are not persuasive.

18. There is no need to address applicant's arguments concerning the JP'836 and the JP'507 because rejections based thereon have been withdrawn.

19. Now, with respect to Kidai et al, applicant has indicated that “...*this disclosure in Kidai et al would have neither taught nor would have suggested such sheet chemical cell as in the present claims, including inter alia, wherein the first wiring plates and the second wiring plates, covering the respective anodes and respective cathodes, respectively, are connected through respective slots...*”. The examiner respectfully but strenuously disagrees with applicant's apparent characterization of Kidai et al's teachings. For instance, (emphasis supplied→)

EXAMPLE 1 exemplifies the preparation of a multipore film having a porous area 1 and non-porous area 2; wherein the porous area 1 is filled with the Nafion proton conductor (EXAMPLE 1/ P0100-0103). The electrolyte membrane having a slot may be represented by either the membrane permeating area 4 including the electron conductor through membrane 5 or the multipore film having a porous area (slots). The anode, cathode and electrolyte are separated by a separator (P0005). In the instant case, the separators serve as the plurality of wiring plates

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covering respective cathodes and anodes. Electrodes 7 are connected through respective electron conductor through membrane 5 (See FIGURE 6). Furthermore, in fuel cell, respective fuel cell components are either electrically connected, operatively connected or physically connected; and they all are also either directly or indirectly connected. If the membrane permeating area having the electron conductor through membrane 5 is taken to represent the membrane/slot, then the separator plates are both electrically and operatively connected. On the other hand, if porous area filled with Nafion represents the electrolyte membrane having slots, then the separator plates are at least operatively connected.

20. With respect to Choi, applicant has advanced the argument that “*the first and second wiring plates, connected through respective slots*” are not taught. In fact, Choi evidently discloses that in order to electrically connect the respective cells, a connection wire 4 connecting anode 2a and cathode 3a of neighboring cells must pass through the ion exchange membrane 1a between the anode 2a and the cathode 3a. In addition to that, disclosed is that both of the anode 2 and the cathode 3 include a support layer for supply and diffusion of fuel (COL 1, lines 28-32). Literal claim scope permits to reasonably interpret the language of the claimed invention absent any specific structural limitation of what is meant by “wiring plates”. As such, the examiner contends that these support layers may serve as the plurality of wiring plates covering respective anodes/cathodes; and it can also be said that they all are either electrically connected, operatively connected and/or physically connected. Present claim also fails to specifically define what kind of connection is currently intended.

21. In response to applicant's argument that the his connection of the wiring plates/anodes-cathodes is advantageous, the fact that applicant has recognized another advantage which would

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flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Additionally, teaching-away arguments are not germane to rejections based upon anticipation or under section 102.

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro
Primary Examiner
Art Unit 1745


**RAYMOND ALEJANDRO
PRIMARY EXAMINER**